

# CTD data from collected from the R/V Oceanus OC1504A along the Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W during 2015

**Website:** <https://www.bco-dmo.org/dataset/652162>

**Data Type:** Cruise Results

**Version:** 1

**Version Date:** 2016-07-18

## Project

» [Linking physiological and molecular aspects of diatom silicification in field populations](#) (Diatom Silicification)

| Contributors                            | Affiliation   | Role                            |
|---|---|---------------------------------|
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| <a href="#">Brzezinski, Mark A.</a>     | University of California-Santa Barbara (UCSB-LifeSci) | Co-Principal Investigator       |
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## Abstract

CTD data from collected from the R/V Oceanus OC1504A along the Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W during 2015

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## Coverage

**Spatial Extent:** N:43.65434 E:-120.81017 S:34.551 W:-124.48169

**Temporal Extent:** 2015-04-20 - 2015-05-01

## Dataset Description

These are processed CTD data from the OCE1504A cruise, Molecular Underpinnings of Silicification in the California Current (MUSiCC), including fluorometry and dissolved O<sub>2</sub>.

## Methods & Sampling

Data were collected using a CTD fitted with a variety of sensors. See the event log for more details: DOI: 10.1575/1912/bco-dmo.651685.1

## Data Processing Description

**DMO notes:**

BCO-DMO made the following modifications to the data display:

- Edited column names to meet BCO-DMO standards
- Added ISO date time column
- Added lat/lon coordinates using those found in the event log

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## Data Files

| File  |
|---|
| <b>MUSiCC_CTD_data.csv</b> (Comma Separated Values (.csv), 46.37 KB)<br>MD5:05fef35dac7ff511fcf5f2ab92bb61b |
| Primary data file for dataset ID 652162   |

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## Parameters

| Parameter        | Description                            | Units                                       |
|------------------|--|---|
| cruise           | cruise name given to OC150A            | unitless                                    |
| CTD              | CTD cast id                            | unitless                                    |
| lat              | latitude                               | decimal degrees                             |
| lon              | longitude                              | decimal degrees                             |
| bottle           | bottle number                          | unitless                                    |
| date             | date of cast; mm-bbb-yy                | unitless                                    |
| time             | time of cast; HH:MM:SS                 | unitless                                    |
| depth            | depth of cast                          | meters                                      |
| press            | pressure in decibars                   | decibars                                    |
| temp0            | temperature in degrees C from sensor 1 | celsius                                     |
| temp1            | temperature in degrees C from sensor 2 | celsius                                     |
| cond0            | conductivity from sensor 1             | siemens per meter                           |
| cond1            | conductivity from sensor 2             | siemens per meter                           |
| sal00            | salinity from sensor 1                 | PSU   |
| sal11            | salinity from sensor 2                 | PSU   |
| sigma_theta00    | sigma theta density from sensor 1      | kilograms per meter cubed                   |
| sigma_theta11    | sigma theta density from sensor 2      | kilograms per meter cubed                   |
| fluor            | fluorescence                           | milligrams per meter cubed                  |
| trans            | light transmission as percent          | dimensionless                               |
| beam_c           | beam attenuation (loss of light)       | 1/meters                                    |
| O2_umol_kg       | dissolved oxygen                       | micromoles per kilogram                     |
| PAR              | photosynthetically available radiation | microEinsteins per meter squared per second |
| ISO_DateTime.UTC | DateTime (UTC) ISO formatted           | unitless                                    |

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## Deployments

### OC1504A

|                    |  |
|--------------------|--|
| <b>Website</b>     | <a href="https://www.bco-dmo.org/deployment/560135">https://www.bco-dmo.org/deployment/560135</a>  |
| <b>Platform</b>    | R/V Oceanus  |
| <b>Report</b>      | <a href="https://musicc2015.wordpress.com">https://musicc2015.wordpress.com</a>  |
| <b>Start Date</b>  | 2015-04-19   |
| <b>End Date</b>    | 2015-05-02   |
| <b>Description</b> | Data for the project "Linking physiological and molecular aspects of diatom silicification in field populations" (PIs Kimberlee Thametrakoln and Mark Brzezinski) were collected on this cruise. |

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## Project Information

### Linking physiological and molecular aspects of diatom silicification in field populations (Diatom Silicification)

**Coverage:** Oregon/California Coastal Upwelling Zone, between 34-44N and 120-124W

#### *Description from NSF award abstract:*

Diatoms, unicellular, eukaryotic photoautotrophs, are among the most ecologically successful and functionally diverse organisms in the ocean. In addition to contributing one-fifth of total global primary productivity, diatoms are also the largest group of silicifying organisms in the ocean. Thus, diatoms form a critical link between the carbon and silicon (Si) cycles. The goal of this project is to understand the molecular regulation of silicification processes in natural diatom populations to better understand the processes controlling diatom productivity in the sea. Through culture studies and two research cruises, this research will couple classical measurements of silicon uptake and silica production with molecular and biochemical analyses of Silicification-Related Gene (SiRG) and protein expression. The proposed cruise track off the West Coast of the US will target gradients in Si and iron (Fe) concentrations with the following goals: 1) Characterize the expression pattern of SiRGs, 2) Correlate SiRG expression patterns to Si concentrations, silicon uptake kinetics, and silica production rates, 3) Develop a method to normalize uptake kinetics and silica production to SiRG expression levels as a more accurate measure of diatom activity and growth, 4) Characterize the diel periodicity of silica production and SiRG expression.

It is estimated that diatoms process 240 Teramoles of biogenic silica each year and that each molecule of silicon is cycled through a diatom 39 times before being exported to the deep ocean. Decades of oceanographic and field research have provided detailed insight into the dynamics of silicon uptake and silica production in natural populations, but a molecular understanding of the factors that influence silicification processes is required for further understanding the regulation of silicon and carbon fluxes in the ocean. Characterizing the genetic potential for silicification will provide new information on the factors that regulate the distribution of diatoms and influence in situ rates of silicon uptake and silica production. This research is expected to provide significant information about the molecular regulation of silicification in natural populations and the physiological basis of Si limitation in the sea.

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## Funding

| Funding Source   | Award                       |
|--|-----------------------------|
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-1333929</a> |
| <a href="#">NSF Division of Ocean Sciences (NSF OCE)</a> | <a href="#">OCE-1334387</a> |

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